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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 09969-006		FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/CA2004/001509		International filing date (day/month/year) 16 August 2004 (16-08-2004)		Priority date (day/month/year) 15 August 2003 (15-08-2003)
International Patent Classification (IPC) or national classification and IPC IPC(7): C07D 209/86, C08F 26/12				
Applicant UNIVERSITE DE LAVAL ET AL				
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>30</u> sheets, as follows:</p> <p style="padding-left: 40px;"><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="padding-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. 1 and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>				
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>				
Date of submission of the demand 15 June 2005 (15-06-2005)		Date of completion of this report 20 December 2005 (20-12-2005)		
Name and mailing address of the IPEA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001(819)953-2476		Authorized officer Edith Lacasse (819) 934-2325		

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Box No. I Basis of the report

1. With regard to the language, this report is based on:
 - ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of:
 - ☐ international search (Rules 12.3(a) and 23.1(b))
 - ☐ publication of the international application (Rule 12.4(a))
 - ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
 - ☐ the international application as originally filed/furnished
 - ☒ the description:
 - ☒ pages 1 to 2, 11 to 15 and 17 to 39 as originally filed/furnished
 - ☒ pages* 6, 7, 9, 10 and 16 received by this Authority on 15 June 2005 (15.06.05)
 - ☒ pages* 3 to 5 and 8 received by this Authority on 14 November 2005 (14.11.05)
 - ☒ the claims:
 - ☐ pages _____ as originally filed/furnished
 - ☐ pages* _____ as amended (together with any statement) under Article 19
 - ☒ pages* 40 to 60 received by this Authority on 14 November 2005 (14.11.05)
 - ☐ pages* _____ received by this Authority on _____
 - ☐ the drawings:
 - ☐ pages _____ as originally filed/furnished
 - ☐ pages* _____ received by this Authority on _____
 - ☐ pages* _____ received by this Authority on _____
 - ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.
 - 3. ☒ The amendments have resulted in the cancellation of:
 - ☐ the description, pages _____
 - ☒ the claims, Nos. 6, 7, 20, 21, 46, 50, 55, 59, 61 to 63, 65, 68, 71, 75, 78, 82, 84, 85, 87, 89 to 91, 94, 97, 102, 107, 109, 112, 114, 117, 119, 122, 124, 127, 129 and 132
 - ☐ the drawings, sheets/figs _____
 - ☐ the sequence listing (*specify*): _____
 - ☐ any table(s) related to sequence listing (*specify*): _____
 - 4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
 - ☐ the description, pages _____
 - ☐ the claims, Nos. _____
 - ☐ the drawings, sheets/figs _____
 - ☐ the sequence listing (*specify*): _____
 - ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/CA2004/001509**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	<u>1 to 102</u>	YES
	Claims	<u>none</u>	NO
Inventive step (IS)	Claims	<u>1 to 102</u>	YES
	Claims	<u>none</u>	NO
Industrial applicability (IA)	Claims	<u>1 to 102</u>	YES
	Claims	<u>none</u>	NO

2. Citations and explanations (Rule 70.7)

Reference is made to the following documents:

- D1: WO 03/022816 A1 (Equistar Chemicals, LP) 20 March 2003 (20.03.2003)
D2: US 5902884 (Clariant GmbH) 11 May 1999 (11.05.1999)
D3: CA 2196046 (Sankyo Company) 08 February 1996 (08.02.1996)
D4: CA 1026348 (Hoffman-La Roche Limited) 14 February 1978 (14.02.1978)
D5: Limburg, W.W.; Yanus, J.F.; Williams, D.J.; Goedde, A.O.; Pearson, J.M., *Journal of Polymer Science, Polymer Chemistry Edition*, 1975, 13(5), 1133-9.
D6: Ambrose, J.F.; Nelson, R.F., *J. Electrochem. Soc.*, 1968, 115, 1159-1164.
D7: Registry Number 86-74-8 CAPLUS (9H-Carbazole)
D8: Registry Number 1484-12-4 CAPLUS (9-Methyl-Carbazole)
D9: Registry Number 86-28-2 CAPLUS (9-Ethyl-Carbazole)
D10: Registry Number 1484-08-8 CAPLUS (9-Butyl-Carbazole)
D11: Registry Number 1150-62-5 CAPLUS (9-Phenyl-Carbazole)
D12: Registry number 56166-62-2 CAPLUS (9-Ethyl-2-Carbazaldehyde)
D13: Registry number 3110-89-1 CAPLUS (9-Methyl-2,7-dicarbazaldehyde)
D14: CA 2360826 (Université Laval) 30 April 2002 (30.04.2002)
D15: Liu, B.; Yu, W.-L.; Pei, J.; Liu, S.-Y.; Lai, Y.-H.; Huang, W., *Macromolecules*, 2001, 34(23), 7932-7940.
D16: Goldoni, F.; Janssen, A.J.; Meijer, E.W., *J. Polym. Sci. Part A*, 1999, 37, 4629-4639.

Novelty

The subject matter of claims 1 to 102 comply with Article 33(2) of the PCT.

D1 to D13 disclose carbazole derivatives which are unsubstituted or substituted at position 2 and/or 7. The carbazole derivatives of claims 1 to 39 differ from the compounds disclosed in D1 to D13 in that the selected substituents are different.

D14 discloses conjugated polycarbazole derivatives and their use as electroactive and photoactive materials. The oligocarbazole and polycarbazole derivatives of claims 40 to 102 differ from D14 in that they comprise a vinylene unit in the polymer backbone.

(See Supplemental Box)

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

A statement in an application, such as found on page 2 which incorporates by reference any other document, does not comply with Article 5 PCT.

The general statement in the description at page 37 implies that the extent of protection may be expanded in some vague and not precisely defined way, and when used to interpret the claims renders them also unclear, contrary to Article 6 PCT.

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Section V:

Inventive Step

The subject matter of claims 1 to 102 comply with Article 33(3) of the PCT.

The closest prior art is considered to be D14 which discloses conjugated polycarbazole derivatives and their use as electroactive and photoactive materials. The problem to be solved by the present application is considered to be the provision of further conjugated polycarbazoles. The oligocarbazole and polycarbazole derivatives of claims 40 to 102 differ from D14 in that they comprise a vinylene unit in the polymer backbone.

D15 discloses the synthesis of bipyridyl-containing conjugated polymers wherein the monomers are linked by C-C single, vinylene or ethynylene bonds. D15 further teaches that the use of a C-C single bond linker provides for polymeric systems having improved sensitivity to metal ions and as such teaches away from the carbazole vinylene oligomers and polymers of claims 1 to 102.

D16 discloses the synthesis and optical properties of copolymers of thienylene and vinylene carrying alkylthio side chains. The properties of these polymers are reported as being dependent on the ratio of the thiophene and vinylene building blocks. However, D16 is silent with respect to polycarbazole-based derivatives comprising a vinylene unit in the polymer backbone as taught in the present application.

Therefore, the subject matter of claims 1 to 102 is considered to involve an inventive step.

Industrial Applicability

The subject matter of claims 1 to 102 is considered to be industrially applicable and thus fulfilling the requirements of Article 33(4) PCT.